



**US Army Corps
of Engineers®**

Engineer Research and
Development Center

Coastal Inlets Research Program

Coastal Structure Asset Management

Problem Corps is lacking a logical and consistent procedure for prioritizing needed repair and maintenance for its inventory of coastal jetties, breakwaters, and other assets estimated at \$15B in value.

Research Approach Identify the most critical coastal navigation structures in terms of the consequences of damage or failure, and develop information that can be used to assess impacts of postponing repairs. Factors include direct economic loss to the Corps and local interests, future economic losses such as reduced employment or commerce, and societal impacts.

Labs/others involved CHL: All coastal Districts involved through brainstorming workshops and in data assembly. IWR will be involved in the economic analysis.

Final Products Database of critical coastal infrastructure; repair and maintenance prioritization schema; analysis tools for coastal structure design and repair.

Point of Contact Dr. Steve Hughes, Steven.A.Hughes@erdc.usace.army.mil; Additional information can be found at <http://cirp.wes.army.mil/cirp/cirp.html>.

Coastal Inlets Research Program

Validation of Predictive Technology

Problem Field testing, input, and feedback are necessary for infusing predictive technology at project level.

Research Approach Seek and promote opportunities for District-CIRP R&D partnership, emphasizing projects with applicability nationwide. With validated models and available data, conduct research to generalize results for broad O&M applicability.

Labs/others involved CHL: All coastal Districts involved.

Final Products Field-tested models covering the full range of conditions encountered by Districts; desktop and web-based tools for rapid assessment of O&M activities.

Point of Contact Julie Dean Rosati at Julie.D.Rosati@erdc.usace.army.mil. Additional information can be found at <http://cirp.wes.army.mil/cirp/cirp.html>.

Coastal Inlets Research Program

Inlet Bypassing & Nearshore Berms

Problem	Coastal inlets and adjacent beaches must be managed as a system.
Research Approach	Develop predictive technology, focusing on sediment transport and morphology change for the coastal inlet area that involves interacting waves, currents, rivers, sediment transport, and changing sea bottom. Develop specialized models to efficiently predict navigation channel infilling, coastal barrier breaching near inlets, and nearshore berm evolution.
Labs/others involved	CHL: All coastal Districts.
Final Products	Coastal Modeling System (CMS) that covers both two- and three-dimensional capability, including sediment transport by waves, channel infilling models, and breaching model.
Point of Contact	Ken Connell at Kenneth.J.Connell@erdc.usace.army.mil . Additional information can be found at http://cirp.wes.army.mil/cirp/cirp.html .

Coastal Inlets Research Program

Program Management & Tech Transfer

Problem	Program requires management and coordination, and field proponents for tech transfer.
Research Approach	Coordinate and synchronize Focus Areas and Work Units in CIRP; coordinate with other ERDC R&D Programs; coordinate with HQ; organize workshops and conduct other tech-transfer activities such as the CIRP eNewsletter. Support Surfacewater Modeling System (SMS) and other interface development and web sites for product infusion.
Labs/others involved	CHL, other ERDC R&D programs, Districts. All coastal Districts involved through brainstorming workshops and in data assembly.
Final Products	Tech transfer via workshops and email newsletter to Corps coastal community.
Point of Contact	Dr. Nick Kraus at Nicholas.C.Kraus@erdc.usace.army.mil . Additional information can be found at http://cirp.wes.army.mil/cirp/cirp.html .

Coastal Inlets Research Program

Coastal Inlet Geomorphic Evolution

Problem Morphologic change at coastal inlets is varied, complex, and can occur over decades to centuries. Federal navigation projects will alter the coast for great spatial and temporal ranges.

Research Approach Analyze geomorphic evolution at inlets, including responses to jetties and maintained navigation channels, and develop models to predict morphology change at year, decade, and century scales.

Labs/others involved CHL: All coastal Districts and their consulting companies in testing software.

Final Products Inlet Reservoir Model; GIS analysis products for navigation channels, inlet morphologic features, and adjacent beaches.

Point of Contact Dr. Nick Kraus at Nicholas.C.Kraus@erdc.usace.army.mil. Additional information can be found at <http://cirp.wes.army.mil/cirp/cirp.html>.

Coastal Inlets Research Program

Advanced Wave Modeling for Inlets and Navigation

Problem Prediction capability is lacking for waves at inlets and navigation channels, and in the vicinity of structures involving diffraction, wave-current interaction, reflection, transmission, and wave-wave interaction.

Research Approach Develop suite of advanced numerical models that can accurately predict complex non-linear wave transformation processes at inlets, navigation channels, and harbors, provide design wave parameters for navigation structures, and wave runup and overtopping on coastal structures. .

Labs/others involved CHL: All coastal Districts and their consulting companies in testing software.

Final Products Boussinesq and Extended Mild-Slope Equation modeling suite of phase-resolving models, time- and frequency-domain, pre- and post-processing data analyses capabilities, and supporting 1-D analysis toolboxes for engineering design estimates of infra-gravity waves and wave runup and overtopping.

Point of Contact Dr. Zeki Demirbilek at Zeki.Demirbilek@erdc.usace.army.mil. Additional information can be found at <http://cirp.wes.army.mil/cirp/cirp.html>.

Coastal Inlets Research Program

Basic Inlet Processes

Problem	In the complex hydrodynamic and sediment transport environment of coastal inlets, all predictive technology depends on availability of accurate estimates of waves, current, sediment transport, and morphology change, as well as improved numerical methods. Improvements of basic knowledge needed in many areas.
Research Approach	Produce improved and reliable predictive formulas for engineering use.
Labs/others involved	CHL: All coastal Districts involved through brainstorming workshops and in data assembly.
Final Products	Peer-reviewed formulas and publications on fundamental wave, current, and sediment transport processes; data reports; detailed documentation on predictive technology.
Point of Contact	Dr. Lihwa Lin, Lihwa.Lin@erdc.usace.army.mil . Additional information can be found at http://cirp.wes.army.mil/cirp/cirp.html .